IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): A photon emitter comprising:

a photon generator configured to generate randomly polarized photons separable into a first polarisation state and a second polarisation state, the first polarisation state being orthogonal to the second polarisation ~~stat~~ state; and

time delay means receiving said randomly polarized photons and being configured to delay photons having the second polarisation state with respect to those having the first polarisation state such that photons which enter the time delay means with the first polarisation exit the time delay means at a different time to photons which enter the time delay means with the second polarisation.

Claim 2 (Original): A photon emitter according to claim 1, wherein the time delay means comprises a polarising beamsplitter which directs photons having the first polarisation state along a first path and photons having the second polarisation state along a second path and combining means to combine the first and second paths, one of the paths being longer than the other path.

Claim 3 (Original): A photon emitter according to claim 2, wherein one of the paths is provided with means to rotate the polarisation of photons passing through said path such that photons from the first path and the second path at the combining means have the same polarisation.

Claim 4 (Original): A photon emitter according to claim 1, wherein the time delay means comprises a single path configured to allow photons having a first polarisation state to travel at a different speed to photons with a second polarisation state.

Claim 5 (Original): A photon emitter according to claim 1, further comprising encoding means, wherein photons which have passed through the time delay means are passed into an encoding means.

Claim 6 (Original): A photon emitter according to claim 5, wherein the encoding means is capable of performing a different encoding operation on photons with the first polarisation state than those with the second polarisation state.

Claim 7 (Previously Presented): A photon emitter according to claim 5, wherein the encoding means are configured to encode the phase of a photon and comprise an interferometer, said interferometer comprising an entrance coupler connected to a long arm and a short arm, said long arm and short arm being joined at their other ends by an exit coupler, one of said arms having a phase modulator which allows the phase of a photon passing through that arm to be set to one of at least two values.

Claim 8 (Original): A photon emitter according to claim 7, wherein the time delay means comprises a polarising beamsplitter which directs photons having the first polarisation state along a first path and photons having the second polarisation state along a second path and combining means to combine the first and second paths, one of the paths being longer than the other path and wherein said entrance coupler has first and second inputs and first and

second outputs, wherein the first and second outputs are connected to the long arm and short arm of the interferometer, and photons which pass through the first path and second path are coupled into the same input of the entrance coupler.

Claim 9 (Previously Presented): A photon emitter according to claim 8, wherein said phase modulator is capable of providing a different modulation to photons which pass through the first path than those which path through the second path, such that photons generated with the first or second polarisation state exit the interferometer with the same phase state.

Claim 10 (Original): A photon emitter according to claim 7, wherein the time delay means comprises a polarising beamsplitter which directs photons having the first polarisation state along a first path and photons having the second polarisation state along a second path and combining means to combine the first and second paths, one of the paths being longer than the other path and wherein said entrance coupler has first and second inputs and first and second outputs connected, wherein said first and second outputs are connected to said long arm and short arm of the interferometer, and said entrance coupler also provides the combining means for the first path and the second path such that photons which follow the first path enter the entrance coupler by the first input and photons which follow the second path enter the entrance coupler by the second input.

Claim 11 (Original): A photon emitter according to claim 5, wherein the photons are encoded using polarisation.

Claim 12 (Original): A photon emitter according to claim 11, wherein said encoding means are configured to rotate the polarisation of the delayed photons through a different angle than the polarisation of the non-delayed photons, such that photons generated with either the first or second polarisation state exit the encoding means with the same polarisation state.

Claim 13 (Original): A photon emitter according to claim 1, further comprising means to rotate the polarisation of the delayed photons by 90°, such that photons are emitted having the same polarisation.

Claim 14 (Previously Presented): A quantum communication system comprising:

a photon emitter comprising:

a photon generator configured to generate randomly polarized photons separable into a first polarisation state and a second polarisation state the first polarisation state being orthogonal to the second polarisation state;

time delay means receiving said randomly polarized photons being configured to delay photons having the second polarisation state with respect to those having the first polarisation state; and

encoding means, wherein photons which have passed through the time delay means are passed into an encoding means,

the communication system further comprising a receiver having means to decode the photons and a detector,

wherein photons which enter the time delay means with the first polarisation exit the time delay means at a different time to photons which enter the time delay means with a

second polarisation and photons with the first polarisation are temporally separated from photons with the second polarisation when entering the encoding means.

Claim 15 (Original): A quantum communication system according to claim 14, wherein said encoding means are configured to encode the phase of a photon and comprise a first interferometer, said interferometer comprising an entrance coupler connected to a long arm and a short arm, said long arm and short arm being joined at their other ends by an exit coupler, one of said arms having first phase variation means which allows the phase of a photon passing through that arm to be set to one of at least two values, the receiver comprising a second interferometer, the second interferometer comprising an entrance coupler connected to a long arm and a short arm, said long arm and short arm being joined at their other ends by an exit coupler, one of said arms having second phase variation means which allows the phase of a photon passing through that arm to be set to one of at least two values.

Claim 16 (Original): A system according to claim 15, further comprising directing means configured to ensure that photons which have passed through the short arm of the first interferometer are directed down the long arm of the second interferometer and photons which have passed through the long arm of the first interferometer pass through the short arm of the second interferometer.

Claim 17 (Original): A system according to claim 16, wherein the directing means comprises first polarising means configured to allow photons which have travelled through different arms of the first interferometer different polarisations and second polarising means

which distinguish between the photons having different polarisations and direct them down the appropriate arm of the second interferometer.

Claim 18 (Original): A system according to claim 15, further comprising means to vary the path length of one of the arms of at least one of the interferometers such that photon pulses which take the short arm of first interferometer and the long arm of the second interferometer take the same time to pass through both interferometers as photon pulses which pass through the long arm of the first interferometer and the short arm of the second interferometer.

Claim 19 (Original): A quantum communication system according to claim 14, further comprising means to apply a gating signal to the detector, said gating signal being provided to switch the detector between an `on mode` where photons may be detected and an `off mode` where photons may not be detected.

Claim 20 (Original): A quantum communication system according to claim 19, wherein the detector is in an `on mode` from the time when it expects to receive a photon which has followed the shortest path through the time delay means until and including the time when it expects to receive a photon which has followed the longest path through the time delay means.

Claim 21 (Original): A quantum communication system according to claim 19, wherein the detector is in an "on mode" for the two intervals when a photon is expected after following the first or second path in the time delay means.

Claim 22 (Original): A quantum communication system according to claim 15, further comprising means to apply a gating signal to the detector, said gating signal being provided to switch the detector between an `on mode` where photons may be detected and an `off mode` where photons may not be detected wherein the detector is in an off mode when it expects to receive photons which have passed through either the long arms of both interferometers or the short arms of both interferometers.

Claim 23 (Original): A system according to claim 14, further comprising means to communicate a clock signal between emitter and receiver.

Claim 24 (Original): A system according to claim 14, wherein a clock pulse is sent from the emitter to the receiver with each photon from the generator.

Claim 25 (Original): A system according to claim 24, wherein the clock signal has a different wavelength to the photons emitted from the photon generator.

Claim 26 (Original): A system according to claim 24, wherein the clock signal has a different polarisation to that of the photons sent to the receiver from the photon generator.

Claim 27 (Previously Presented): A method of outputting photons, the method comprising:

providing a photon generator configured to generate randomly polarized photons separable into a first polarisation state and a second polarisation state; and

delaying the randomly polarized photons having the second polarisation state with respect to those having the first polarisation state such that photons which are generated with a first polarisation state are temporally separated from photons having a second polarisation state.

Claim 28 (Original): A method according to claim 27, further comprising separating photons having the first polarisation state from those having the second polarisation state.

Claim 29 (Original): A method according to claim 27, further comprising rotating the polarisation of the delayed photons by 90°.

Claim 30 (Original): A method according to claim 27, further comprising passing the photons through an interferometer and modulating the delayed photons as they pass through the interferometer such that photons which initially had the first and second polarisation states emerge from the interferometer with the same phase shift.

Claim 31 (Previously Presented): A polarisation distinguisher for a photon generator configured to generate randomly polarized photons separable into a first polarisation state ~~or~~ and a second polarisation state; said distinguisher comprising:

time delay means receiving said randomly polarized photons and being configured to delay photons having the second polarisation state with respect to those having the first polarisation state., such that photons which enter the time delay means with the first polarisation exit the time delay means at a different time to photons which enter the time delay means with the second polarisation.

Claim 32 (Previously Presented): A photon emitter according to claim 1, wherein the photon generator comprises a single photon source.

Claim 33 (Previously Presented): A photon emitter according to claim 32, wherein the single photon source emits a single photon pulse having a duration in a range of 100 ps to 1 ns.

Claim 34 (Previously Presented): A method according to claim 27, wherein providing a photon generator comprises providing a single photon source.

Claim 35 (Previously Presented): A method according to claim 34, wherein providing a single photon source comprises providing a single photon pulse having a duration in a range of 100 ps to 1 ns.